UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/490,631	01/24/2000	Yutaka Usami	00037/LH	7420

1933 7590 01/20/2004

FRISHAUF, HOLTZ, GOODMAN & CHICK, PC
767 THIRD AVENUE
25TH FLOOR
NEW YORK, NY 10017-2023

EXAMINER	
DAY, HERNG DER	
ART UNIT	**PAPER NUMBER**
2128	16

DATE MAILED: 01/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/490,631	USAMI ET AL.	
	Examiner	Art Unit	
	Herng-der Day	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 September 2003 and 17 October 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 April 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. This communication is in response to Applicants' Amendment (paper # 11) to Office Action dated June 20, 2003 (paper # 10), mailed September 10, 2003.

1-1. Claims 1, 2, 9, 10, 17, and 18 have been amended; claims 1-24 are pending.

1-2. Claims 1-24 have been examined and claims 1-24 have been rejected.

Drawings

2. The drawings are objected to for the following reasons. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application.

2-1. Figures 1, 15 and 16 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

2-2. Capacitor C1, as shown in FIG. 9, has been disappeared in FIG. 10. However, FIG. 10 is the equivalent cell circuit diagram of FIG. 9 as described in lines 13-15 of page 16.

Specification

3. The disclosure is objected to because of the following informalities:

Appropriate correction is required.

3-1. It appears that "as shown in FIG. 3A", as described in line 27 of page 11, should be "as shown in FIG. 4A".

3-2. It appears that "as shown in FIG. 3B", as described in line 5 of page 12, should be "as shown in FIG. 4B".

3-3. It appears that equation (9), as described in line 21 of page 14, is incomplete.

Claim Objections

4. Claim 1 is objected to because of the following informalities. Appropriate correction is required. As described in the last line of the claim, "(iii) simulating a± state of the particles" (Emphasis added).

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1-24 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

6-1. For example, all independent claims recite the limitations "the particle transfer is executed for all of the element cells in units of one element cell" and "repeatedly performing transfer and updating processes until ... converge". Since the number of repeating loops depends upon convergence, any constant voltage source, for example, may need special

treatment. However, no details have been disclosed in the specification. Therefore, without undue experiment, it is unclear for one skilled in the art how to make and/or use the invention.

6-2. For example, independent claims 2, 10, and 18 recite the limitation "setting ..., in units of element cells, a rule ...". Since no details of setting a rule "in units of element cells" have been disclosed in the specification. Therefore, without undue experiment, it is unclear for one skilled in the art how to set a rule "in units of element cells".

6-3. For example, claims 5, 13, and 21 recite the limitation "when a given one of the *element cells* has nonlinearity as a function of time, defining ... the given circuit element as a combination of ... and ...". Since no details of "combination" for "an *element cell* has nonlinearity as a function of time", have been disclosed in the specification. Therefore, without undue experiment, it is unclear for one skilled in the art how to make the claimed combination.

6-4. Claims not specifically rejected above are rejected as being dependent on a rejected claim.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claim 23 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8-1. Claim 23 recites the limitation "the nonlinear element" in line 7 of the claim. There is insufficient antecedent basis for this limitation in the claim. For the purpose of claim examination, the Examiner will presume that claim 23 is a dependent claim of claim 21 and claim 24 is a dependent claim of claim 22.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Alvarado et al., "General Purpose Symbolic Simulation Tools for Electric Networks" IEEE Power Industry Computer Application Conference, May 1987.

10-1. Regarding claim 1, Alvarado et al. disclose an electric network simulating method comprising the steps of:

defining a plurality of element cells representing respective electric functions of a plurality of circuit element and a plurality of connection pipes representing wiring lines for connecting the circuit elements, defining an electric network current as the number of particles moving in the connection pipe per unit time, and defining an electric network voltage as the number of particles present in the connection pipe (direct modeling method, page 693, IV);

on the basis of definitions defined in the defining step, setting beforehand, with respect to each element cell, a rule for expressing an electric function of each of the circuit elements (rules, page 690);

transferring particles between the element cell and the connection pipe in accordance with the rule set in the setting step, wherein the particle transfer is executed for all of the element cells in units of one element cell (direct modeling method, pages 693-694, IV); and

simulating a state of the electric network by (i) updating the number of particles passing through each connection pipe per unit time in the transferring step and the number of particles present in each said connection pipe, (ii) repeatedly performing transfer and updating processes until the updated number of particles passing through each connection pipe per unit time and the updated number of particles present in each said connection pipe converge, and (iii) simulating a state of the particles (SOLVER-Q can be used as a general purpose simulator which is able to solve a variety of simulation problems, page 694, column 1).

10-2. Regarding claim 2, Alvarado et al. disclose an electric network simulating method comprising the steps of:

after setting element cells representing electric functions of a plurality of circuit elements, intersection cells representing functions of electric wiring intersections, and connection pipes representing connections between the element cells and the intersection cells, defining a current of an electric network as the number of particles moving in the connection pipe per unit time, and defining a voltage of the electric network as the number of particles present in the connection pipe (direct modeling method, page 693, IV);

on the basis of definitions defined in the defining step, setting beforehand, in units of element cells, a rule expressing an electric function of each of the circuit elements, and setting beforehand, in units of intersection cells, a rule so that the numbers of particles present in the connection pipes connected to the intersection cell are equal to each other and a sum of the numbers of particles transferred at the intersection cell becomes zero (rules, page 690);

transferring particles between the element cell and the connection pipe and between the intersection cell and the connection pipe on the basis of the rules set in the setting step, wherein

the particle transfer is executed for all of the element cells in units of one element cell and for all of the intersection cells in units of one intersection cell (direct modeling method, page 693, IV); and

simulating a state of the electric network by (i) updating the number of particles passing through each connection pipe per unit time and the number of particles present in each said connection pipe in the transferring step, (ii) repeatedly performing transfer and updating processes until the undated number of particles passing through each connection pipe per unit time and the updated number of particles present in each said connection pipe converge, and (iii) simulating a state of the particles (SOLVER-Q can be used as a general purpose simulator which is able to solve a variety of simulation problems, page 694, column 1).

10-3. Regarding claim 3, Alvarado et al. further disclose the setting step includes the step of

when a given one of the circuit elements is a current source, setting a rule for extracting the number of particles corresponding to a current value per unit time from one of two connection pipes connected to an element cell expressing the given circuit element and giving the number of particles equal in number to the number of extracted particles to the other one of the two connection pipes (I-SEND_3_2 and I_REC_3_2, page 694).

10-4. Regarding claim 4, Alvarado et al. further disclose the setting step includes the step of

when a given one of the circuit elements is a voltage source, setting a rule for making a difference between the number of particles in one of two connection pipes connected to an element cell expressing the given circuit element and the number of particles in the other one of the two connection pipes equal to the number of particles corresponding to a voltage of the voltage source (V_SRC, page 692).

10-5. Regarding claim 5, Alvarado et al. further disclose the defining step includes the step of

when a given one of the element cells has nonlinearity as a function of time, defining the given circuit element as a combination of an element cell for a resistive element and one of an element cell expressing a current source and an element cell expressing a voltage source, the combination expresses linearity equivalent to a behavior of the given circuit element at given time (switch is modeled as a function of time and diode can be modeled as an ideal switch with a small linear or nonlinear resistance r_in when it is conducting, page 693); and

the setting step includes the steps of

when a certain one of the circuit elements is a current source, setting a rule for extracting the number of particles corresponding to a current value per unit time from one of two connection pipes connected to an element cell expressing the certain circuit element and giving the number of particles equal in number to the number of extracted particles to the other one of the two connection pipes (direct modeling method, page 693, IV), and

when a specific one of the circuit elements is a voltage source, setting a rule for making a difference between the number of particles in one of two connection pipes connected to an element cell expressing the specific circuit element and the number of particles in the other one of the two connection pipes equal to the number of particles corresponding to a voltage of the voltage source (direct modeling method, page 693, IV).

10-6. Regarding claim 6, Alvarado et al. further disclose the setting step includes the step of

when a given one of the circuit elements has an impedance characteristic discontinuously changing, preparing a plurality of rules for the element cell for expressing the given circuit

element and selecting one of the plurality of rules in accordance with the state of the connection pipe connected to the element ce11 (diode model, page 693).

10-7. Regarding claim 7, Alvarado et al. further disclose the transferring step and the simulating step include the step of

simulating the state of each element cell at initial time so as to simulate a transient phenomenon of the given circuit element having nonlinearity as a function of time, simulating a behavior of the nonlinear element at an operating point advancing by a shortest time interval, by changing each parameter of a combination of the element cells having functions equivalent to the element cells, and simulating the transient phenomenon by repeating the change in parameter every time the shortest time interval has elapsed (SOLVER-Q can be used as a general purpose simulator which is able to solve a variety of simulation problems, page 694, column 1).

10-8. Regarding claim 8, Alvarado et al. further disclose the transferring step and the simulating step include the step of

simulating a behavior of each element cell at initial time so as to simulate a transient phenomenon of the given circuit element having the impedance characteristic discontinuously changing, simulating a behavior of the nonlinear element at an operating point advancing a shortest time interval by executing the transferring step in accordance with the rule selected in accordance with the state of the connection pipe connected to the element cell, and simulating the transient phenomenon by repeating the simulating steps every time the shortest time interval has elapsed (SOLVER-Q can be used as a general purpose simulator which is able to solve a variety of simulation problems, page 694, column 1).

10-9. Regarding claims 9-16, these apparatus claims include same method limitations as in claims 1-8 and are unpatentable using the same analysis of claims 1-8.

10-10. Regarding claims 17-24, these medium claims include same method limitations as in claims 1-8 and are unpatentable using the same analysis of claims 1-8.

Applicants' Arguments

11. Applicants argue the following:

(1) the present invention expresses circuit elements in the form of a particle model (page 22, paper # 11).

(2) the present invention includes transfer step, updating step, and simulation step, which repeatedly transfers and updates particles (page 23, paper # 11).

Response to Arguments

12. Applicants' arguments (1) and (2) have been fully considered. They are not persuasive.

Although Applicants claim a particle model, Applicants manipulate the particles as just numerical numbers in the present application. None of the specific features of particles, for example, velocity, has been disclosed and/or claimed. Therefore, related numerical equations and algorithms meet the claimed limitation of manipulating particles.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Herng-der Day whose telephone number is (703) 305-5269. The examiner can normally be reached on 9:00 - 17:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin J Teska can be reached on (703) 305-9704. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Herng-der Day
January 12, 2004